

Biological Assessment

POWDER RIVER BASIN OIL AND GAS PROJECT

Prepared for:

U.S. Department of Interior

Fish and Wildlife Service

December 2001

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Biological Assessment for the Powder River Basin Oil and Gas Project

Introduction

The purpose of the Biological Assessment (BA) is to review the BLM's Preferred Alternative (Alternative 1) for the Draft Environmental Impact Statement (DEIS) for the Powder River Basin (PRB) Oil and Gas Project and Draft Planning Amendment in sufficient detail to determine if the action "may affect" any federally listed threatened, endangered, or proposed species. This BA was prepared in accordance with the legal requirements set forth under Section 7 (c) of the Endangered Species Act (16 U.S.C.) 1536, stating that a biological assessment be prepared for any Federal action that is a major construction activity to determine the effects of the proposed action on listed and proposed species.

Consultation to Date

In a letter dated June 5, 2001 (Attachment A), regarding the preparation of the Draft Environmental Impact Statement (DEIS) for the PRB Oil and Gas Project, the U.S. Department of Interior, Fish and Wildlife Service (USFWS) referenced its earlier letter (June 5, 2000 [Attachment B]) that identified several threatened, endangered, or proposed species that may be present and potentially affected in the Project Area. These species are the bald eagle (*Haliaeetus leucocephalus*), black-footed ferret (*Mustela nigripes*), mountain plover (*Charadrius montanus*), and Ute ladies'-tresses orchid (*Spiranthes diluvialis*).

Description of the Project

A group of oil and gas companies, collectively identified as the PRB Companies (Companies), has notified the U.S. Department of Interior, Bureau of Land Management (BLM) and U.S. Department of Agriculture, Forest Service (FS) of their intent to develop additional coal bed methane (CBM) resources in Wyoming's PRB. Implementation of this project would continue and expand development of CBM that has been occurring in the PRB over the last few years. In general, the Companies propose to 1) drill, complete, operate, and reclaim almost 39,400 new natural gas wells; and 2) construct, operate, and reclaim various ancillary facilities needed to support the new wells, including roads, pipelines for gathering gas and produced water, electrical utilities, and compressors.

The Companies hold valid federal, state, and private leases for oil and natural gas in the Project Area. The leases exist in a hodge-podge pattern of BLM, state, private,

and split estate ownership, which results in an interspersed pattern rather than large tracts of single ownership. The leases have created contractual and property rights for the Companies from the United States, the State of Wyoming, and private mineral owners to develop oil and natural gas resources. The purpose of the Companies' proposal is to extract and transport oil and natural gas at a profit from the portions of the Project Area leased by them.

The Preferred Alternative would occur in an almost 8 million-acre Project Area. The Project Area encompasses all or parts of Campbell, Converse, Johnson, and Sheridan counties and all or parts of eighteen 4th order watersheds (sub-watersheds). The Preferred Alternative would involve both public and privately owned lands. The public lands include lands administered by the BLM, National Forest System lands, and state lands. Surface ownership is mostly owned by private entities, but the federal government owns the oil and gas rights. Additional information on land ownership and jurisdiction is presented in Chapter 3 of the DEIS.

The Preferred Alternative is to continue development of CBM and conventional oil/gas resources within the Project Area. It is projected that an additional 39,367 CBM wells and 3,200 conventional (i.e., non-CBM) oil/gas wells would be developed over the next ten years. The Preferred Alternative is a combination of the Companies' proposal and the BLM's Reasonably Foreseeable Development (RFD) Scenario. The BLM used the RFD Scenario's moderate level of development and the Companies' proposal to establish the overall level of development of CBM resources likely for the Preferred Alternative. The BLM used the RFD Scenario to establish the overall level of additional development of non-CBM resources within the PRB.

If the Preferred Alternative is implemented, the Companies would drill, complete, and operate 51,444 CBM wells in a ten-year period, including the 12,077 CBM wells already drilled or permitted for drilling in the Project Area. The Companies also would construct the ancillary facilities needed to support these wells. The ancillary facilities include access roads, pipelines for gathering gas and produced water, electrical utilities, facilities for measuring and compressing gas, facilities for treating, discharging, disposing of, containing, or injecting produced water, and pipelines for delivering gas to high-pressure transmission pipelines headed to market.

The overall life of the Preferred Alternative, including drilling, production, and reclamation, is expected to be about 20 years. Construction of the 39,367 new wells would begin during 2002. The productive life of each well is expected to be about seven years. Accordingly, production from at least some of the 39,367 new wells is expected to last until 2018. Final reclamation of these wells would occur during the two to three years following the end of production for each well. Thus, the Preferred Alternative would be completed around 2021.

Based on the practice of collocation and knowledge of where multiple gas-productive coal beds exist, the BLM and Companies project the 39,367 new wells would be drilled from about 26,000 well pads. The total number of wells and well pads are based on an 80-acre well spacing pattern overall (i.e., eight pads per square mile). Including the pads constructed for wells drilled before 2002, the 51,444 CBM wells would be distributed across almost 35,600 well pads. The number of wells on a pad would range from one to three.

Under the Preferred Alternative, the Companies would drill, operate, and maintain wells and construct ancillary facilities in ten of the 18 sub-watersheds that comprise the Project Area. However, most (63 percent) of the new wells and facilities would be constructed in two sub-watersheds: the Upper Powder River and Upper Belle Fourche River sub-watersheds. Other sub-watersheds with relatively high numbers of wells and facilities include Clear Creek, Crazy Woman Creek, Upper Tongue River, and Little Powder River.

Overall, implementation of the CBM portion of the Preferred Alternative could disturb as many as 211,992 surface acres, most of which would be associated with the construction of pipelines, roads, and water handling facilities. Compressor stations would account for the smallest amount of the overall surface disturbance. Short-term (i.e., during the construction period) direct disturbance of land surface would encompass about three percent of the Project Area (about 240,000 acres). Following the reclamation of pipelines and the partial reclamation of other facilities, such as well pads, the Preferred Alternative's long-term disturbance (i.e., lasting beyond the construction period) from CBM development would encompass about 108,800 acres. The long-term disturbance is 45 percent less than the total short-term disturbance. The roads and water handling facilities would comprise most of the long-term disturbance.

The DEIS describes the Preferred Alternative (Alternative 1), as well as the other alternatives considered, in detail. The following sections describe the existing environment, potential effects from the Preferred Alternative, the determination, the cumulative effects, and the anticipated mitigation actions for the listed or proposed species considered by the USFWS to possibly be affected within the Project Area.

Bald Eagle

Existing Environment

On February 14, 1978, the bald eagle was listed as endangered in all of the conterminous United States except Minnesota, Wisconsin, Michigan, Oregon, and Washington, where it was classified as endangered (43 F.R. 6233). The USFWS reclassified the bald eagle from endangered to threatened throughout its range in the lower 48 states on July 12, 1995 (60 F.R. 36000). The bald eagle was proposed for delisting on July 6, 1999 (64 F.R. 36454). Currently, the proposal has not been finalized or withdrawn.

Bald eagles usually nest in trees near water, but are known to nest on cliffs and the ground. Nest sites are usually in large trees near (i.e., within one mile of) shorelines in relatively remote areas that are free of disturbance (USFWS 1999). The bald eagle typically lays a clutch ranging from one to three eggs that are incubated by both the male and female birds for approximately 35 days resulting in usually one or two eaglets produced by the pair (Stalmaster 1987). Typically, the recommended spatial buffer around nests for threatened and endangered raptors in arid landscapes, including the bald eagle, is 1.0 mile (Roman and Muck 1999).

Feeding areas, diurnal perches, and night roosts are fundamental elements of bald eagle winter range. Wintering bald eagles primarily occur where all three of these elements are in close proximity, although they will fly up to 15 miles where these elements are sparsely distributed across the landscape (Swisher 1964), as in this part of Wyoming. Food availability is probably the single most important factor affecting winter bald eagle distribution and abundance (Steenhof 1976). Fish and waterfowl are the primary sources of food where eagles occur along rivers and lakes. Big game and livestock carrion, as well as larger rodents (e.g., prairie dogs) also can be important dietary components where these resources are available.

Bald eagles nest throughout Wyoming, including the Project Area. The Non-game Division of the Wyoming Game and Fish Department (WGFD) knows nest locations in the Project Area, for the most part. Within the Project Area, active nests and winter roosts tend to be associated with forested riparian areas and large lakes and reservoirs that have mature cottonwood trees.

Effects of the Preferred Alternative

Several direct effects to bald eagles including human disturbance, equipment noise, power line collision and electrocution, and vehicular collision may affect bald eagles. Human disturbances during the life of the Preferred Alternative may vary by type and intensity, ranging from one-time pedestrian surveys of development areas, well pad construction and well development, to regular maintenance trips to wells, as well as various equipment operation by humans. Raptors have been known to become accustomed to some human activities, particularly activities that occur regularly and predictably. However, in some cases, particularly nesting and wintering roosts, raptors may exhibit particular sensitivities to nearby human activities, regardless of the activity and its intensity. Disturbance to nesting raptors can cause nest failure, nest abandonment, and unsuccessful fledgling of young. New and additional levels of human disturbance in an area relatively void of human disturbance may have a negative effect to wintering bald eagles roosting and perching in the Project Area. Due to the relative lack of human activity, bald eagles may exhibit sensitivities to activities of short duration and extent that would not otherwise affect bald eagles of other landscapes that are more accustomed to disturbance.

Noise and activities around facilities may disturb bald eagles in nesting attempts, and perhaps foraging, within a certain distance of compressor stations and other facilities. The extent to which these disturbances would affect the bald eagle is unknown and depends on the frequency of maintenance activities, the amount of noise produced by the different types of facilities, and the ability of bald eagles to become accustomed to both consistent noise, and sporadically occurring maintenance activities.

The presence of new aboveground power lines would increase the potential for power line collisions and electrocutions. Power lines from individual well pods to the facilities within each pod, would be constructed underground. These lines are expected to account for the majority of the new lines constructed during the life of the project.

Increased vehicular traffic may result in increased collisions with bald eagles. Collisions with vehicles are often associated with carrion feeding along high-speed road-

ways. Because project-related activities are expected to increase commercial and private traffic levels on public highways within the Project Area, the potential for vehicular collision along these existing highways is expected to increase. Due to the unimproved nature of the existing and proposed access roads, vehicle speeds are not expected to be similar to highway speeds. Within CBM development fields, county roads used to travel to and from the facilities are posted for a 45-mph speed limit. Therefore, vehicle collisions with bald eagles are expected to be uncommon.

Indirect effects to the bald eagle would result from destruction of prey habitat due to well pad and road construction and discharging water, as well as fragmentation of prey habitat and human disturbance to prey populations. Collectively, habitat destruction and disturbance due to project-related activities may result in the loss of suitable nesting and wintering habitats and the loss of preferred prey species habitats and possible reductions in prey base numbers. Quantification of potential losses is directly associated with expected losses by vegetation type. Prey species, particularly small- and medium-sized mammals, may experience losses due to direct mortality and/or loss of habitat. In some instances, particularly with water handling methods, local habitat conditions may improve from the increased water availability and, in turn, benefit local prey species and their dependent predators, including the bald eagle. These benefits may be considered non-permanent, because any improved water availability conditions are expected to return to pre-project levels following the life of the Project. Local prey species may experience a temporary shift in population levels, while population numbers respond to new environmental conditions.

Water handling methods would most likely affect prey habitats and, subsequently, prey population numbers, but water handling methods would not likely directly affect bald eagles or their habitats. Potential adverse effects of water handling facilities may include localized destruction of prey habitats and possible changes in population numbers of locally occurring prey species (i.e., small- and medium-sized mammals).

Mitigation

- In the event that a bald eagle (dead or injured) is located during construction or operation, the USFWS' Wyoming Field Office (307-772-2374) and the USFWS' Law Enforcement Office (307-261-6365) will be notified within 24 hours.
- The BLM shall monitor all take of bald eagle habitat associated with the Preferred Alternative. The actual measurement of disturbed habitat can be the responsibility of the BLM' agent (consultant, contractor, etc.) with a written summary provided to the USFWS' Wyoming Field Office upon project completion, or immediately if the anticipated impact area is exceeded.
- Removing carrion from or near roads as soon as possible would minimize the possibility of vehicular collision with bald eagles foraging on or near roads.
- All power lines would be built to protect raptors, including wintering bald eagles, from accidental electrocution using methods detailed by the Avian Power Line Interaction Committee (1996).

- The appropriate standard seasonal or year-long stipulations for raptors, including wintering bald eagles, as identified by the BLM's Resource Management Plan (BLM 1985), would be applied.
- Special habitats for raptors, including wintering bald eagles, would be identified and considered during the review of the APD/POD or Sundry Notices. A minimum disturbance-free buffer zone of 0.5 mile (i.e., no surface occupancy) would be established for all active raptor nests that were located by surveys during the nesting season (i.e., February 1 through July 31), and this buffer zone would be observed year-round for all bald eagle nest sites. A seasonal minimum disturbance-free buffer zone of one mile would be established for all bald eagle nest sites (February 15 – August 15) and for all bald eagle winter roost sites (November 1 – April 1). These buffer zones and timing may be adjusted based on site-specific information through coordination with, and written approval from, the USFWS.
- Speed limits on all roads associated with project activities shall not exceed 35 miles per hour to minimize the chance of a collision with a bald eagle or other wildlife or livestock. The speed limit shall be enforced.

Determination

Implementation of the Preferred Alternative **is likely to adversely affect, but not likely to jeopardize the continued existence of** the bald eagle and its habitat. The determination is based on the evaluation of the potential adverse effects of the Preferred Alternative on the bald eagle and includes implementation of the mitigation measures presented in this BA.

Black-footed Ferret

Existing Environment

The black-footed ferret (*Mustela nigripes*) is a federally-listed endangered species. The black-footed ferret, a nocturnally active mammal, is closely associated with prairie dogs, depending almost entirely upon the prairie dog for its survival. The decline in ferret populations has been attributed to the reduction in the extensive prairie dog colonies that historically existed in the western United States. Ferrets may occur within colonies of white-tailed or black-tailed prairie dogs. The Project Area is within the range of both the black-tailed and white-tailed prairie dog. The USFWS has determined that, at a minimum, potential habitat for the black-footed ferret must include a single white-tailed prairie dog colony of greater than 200 acres, or a complex of smaller colonies within a 4.3 mile (7 km) radius circle totaling 200 acres (USFWS 1989). The minimum colony size of black-tailed prairie dogs required to be considered black-footed ferret habitat is 80 acres (USFWS 1989). At least 382 black-tailed prairie dog colonies greater than 80 acres in size have been identified to date within the Project Area. Additional colonies are expected to be found, due to the vast areal extent of short-grass and mixed-grass prairie within the Project Area.

The Project Area is within the historical range of the black-footed ferret, although no black-footed ferrets are presently known to occur in northeastern Wyoming. The last known wild population was discovered in 1981 near the town of Meeteetse. Individuals from this population were captured in 1985 through 1987 and raised in protective captive breeding facilities in an effort to prevent the species' extinction (Clark and Stromberg 1987). Recent survey efforts in a former re-introduction site within the Shirley Basin have identified that a population has been successfully established. This is the only known population in Wyoming (Marinari 2001). Other populations of reintroduced captive-bred individuals exist in nearby Badlands National Park in South Dakota, eastern Montana, and Arizona. Extensive efforts have failed to identify any populations of this species within the Project Area; hence this species is not expected to occur within the Project Area.

Effects of the Preferred Alternative

No effects to the black-footed ferret are expected because there are no known occurrences within the Project Area. Surveys by the USFWS for the black-footed ferret have been extensive in Wyoming without any individuals found anywhere within the Project Area.

Mitigation

- Prairie dog colonies would be surveyed for the presence of black-footed ferrets if the colonies meet USFWS guidelines (USFWS 1989). When surveys are required, the entire colony or colony complex affected by the Preferred Alternative would be surveyed. These surveys are required even if part of the colony has a burrow density below eight per acre. If any black-footed ferrets are located, the USFWS would be consulted. Absolutely no disturbance would be allowed within the prairie dog colonies that are found to be inhabited by black-footed ferrets. Disturbance in prairie dog colonies not inhabited by black-footed ferrets would be avoided, wherever possible, to protect the prairie dogs, as well as sensitive species living within the colonies such as the burrowing owl.

Determination

Implementation of the Preferred Alternative **is not likely to adversely affect** the black-footed ferret. This determination is based on the mitigation measures presented in this BA and because of the lack of known black-footed ferret colonies in the Project Area.

Mountain Plover

Existing Environment

The mountain plover (*Charadrius montanus*) is proposed for federal listing as a threatened species (USFWS 2001). This species utilizes high, dry, shortgrass prairie with vegetation typically shorter than four inches tall. Within this habitat, areas of blue grama (*Bouteloua gracilis*) and buffalograss (*Buchloe dactyloides*) are most often utilized, as well as areas of mixed-grass associations dominated by needle-and-thread (*Hesperostipa comata*) and blue grama (Dinsmore 1983).

Nests consist of a small scrape on flat ground in open areas. Most nests are placed on slopes of less than five degrees in areas where vegetation is less than three inches tall in April. More than half of identified nests occurred within 12 inches of old cow manure piles and almost 20 percent were found against old manure piles in similar habitats in Colorado. Nests in similar habitats in Montana (Dinsmore 1983) and other areas (Ehrlich et al. 1988) were nearly always associated with the heavily grazed short-grass vegetation of prairie dog colonies.

Mountain plovers arrive on their breeding grounds in late March with egg-laying beginning in late April. Clutches are hatched by late June and chicks fledge by late July. The fall migration begins in late August and most birds are gone from the breeding grounds by late September.

In Wyoming, this species is a common breeding resident (Luce et al. 1999) and does occur within suitable habitats in the Project Area. Data compiled by the BLM office in Buffalo indicate mountain plover nesting has been documented sporadically throughout the Project Area, including northeastern Converse County, near Gillette and Sheridan. The Wyoming Natural Diversity Database recently published the results of their 2001 survey efforts (modified from the USFWS protocol) in the Powder River Basin of Wyoming (Keinath et al. 2001). Surveys were made only from public roads leaving a great deal of potentially suitable habitats unsurveyed. During these surveys, nine sightings of mountain plovers were recorded, of which two were within the Project Area. Suitable habitat was identified in the Project Area, but characterized as limited and fragmented.

Effects of the Preferred Alternative

The Preferred Alternative has the potential to have substantial adverse direct and indirect effects to the mountain plover. Direct loss of individuals and nests may occur as a result of vehicle collision and equipment operation in nesting areas. Chicks and eggs in nests may also be lost if disturbance or harassment occurs frequently, preventing adults from tending to chicks or nests and allowing excessive heating, chilling, or predation to occur. Frequent disturbance may lead to nest abandonment. Re-nesting may occur at another, less disturbed location, but a net loss in reproductive potential may occur with loss of the initial nest. Mountain plovers also show a high rate of nest site fidelity, often using the same general area year after year. Modifications that

make these sites less suitable for nesting would likely result in decreased reproductive success. New nests may be placed in less suitable habitat, resulting in potentially lower reproductive success.

Noise and activities around facilities would likely prevent mountain plovers from nesting, and perhaps foraging, within a certain distance of compressor stations and other facilities. The extent to which these disturbances would affect the mountain plover is unknown and depends on the frequency of maintenance activities, the amount of noise produced by the different types of facilities, and the ability of mountain plovers to become accustomed to consistent noise and sporadically occurring maintenance activities.

Preferred nesting habitats, such as bare soil, may be created by construction and production activities. While providing habitat, these areas are also likely to result in nests being abandoned or destroyed when activities continue during the nesting season. The potential for this type of impact to occur would be greatest during the production phase, when limited, intermittent activity occurs at well pads and along some access roads. Mountain plovers may arrive and begin nesting on bare ground in these areas, only to be disturbed or have nests destroyed the next time the road is used or the well pad is visited. This impact is most likely when activities occur at an interval of one week or more. During the construction phase, continuous activity is likely to prevent nest establishment in proximity to activities.

Disturbance of prairie dog colonies that provide important habitat components for the mountain plover may have negative effects on this species by reducing the amount of heavily grazed short-grass prairie vegetation.

Predator populations that often increase in areas impacted by humans, such as corvids (i.e., crows, ravens), raptors, coyotes, badgers, weasels, and foxes, may experience an increase in some affected portions of the Project Area and would likely adversely affect mountain plovers. New fences, transmission lines, and buildings would provide new perch and nest sites for avian predators, while buildings and other facilities may provide new denning sites for mammalian predators. Increases in vehicular collisions with wildlife along new and existing roads would provide a food source that may allow increases in predator populations that could also prey on mountain plovers.

Mitigation

- In the event that a mountain plover is located during construction or operation, the USFWS' Wyoming Field Office (307-772-2374) and the USFWS' Law Enforcement Office (307-261-6365) will be notified within 24 hours.
- The BLM shall monitor all take of mountain plover habitat associated with the Preferred Alternative. The actual measurement of disturbed habitat can be the responsibility of the BLM' agent (consultant, contractor, etc.) with a written summary provided to the USFWS' Wyoming Field Office upon project completion, or immediately if the anticipated impact area is exceeded.

- No ground-disturbing activities shall occur in suitable nesting habitat prior to surveys conducted in compliance with the USFWS' Mountain Plover Survey Guidelines (Deibert et al. 1999), regardless of the timing of the disturbance. Once occupied mountain plover nesting habitat is located, the BLM shall re-initiate section 7 consultation with the USFWS on any project-related activities proposed for such habitat. The amount and nature of ground-disturbing activities shall be limited within identified nesting areas in a manner to avoid the abandonment of these areas.
- Operators and the BLM shall be provided by the USFWS with educational material illustrating and describing the mountain plover, its habitat needs, life history, threats, and gas development activities that may lead to incidental take of eggs, chicks, or adults with requirements that these materials be posted in common areas and circulated in a memorandum among all employees and service providers.
- Surveys for nesting mountain plovers would be conducted by appropriately trained personnel if ground-disturbing activities related to the Preferred Alternative are anticipated to occur between May 1 and June 30. A disturbance-free buffer zone of 0.25 mile would be established around all mountain plover nesting locations between March 15 and July 31.
- Project-related features that encourage or enhance the hunting efficiency of predators of mountain plover would not be constructed within 0.25 mile of known mountain plover nest sites.
- Construction of ancillary facilities (e.g., compressor stations, processing plants) shall not be located within 0.5 mile of known nesting areas. The 200-meter buffer described in the USFWS' Mountain Plover Survey Guidelines (Deibert et al. 1999) must be considered for effects of any action regardless of surface ownership.
- The threats of vehicle collision to adult plovers and their broods shall be minimized, especially within breeding aggregation areas. Where possible, locate roads outside of plover nesting areas. Within 0.5 mile of identified nesting areas, speed limits shall be posted at 25 mph on resource roads and 35 mph on local roads for traffic during the breeding season. Road-killed animals (excluding migratory birds) shall be promptly removed from areas within 0.5 mile of identified nesting areas to avoid attracting avian and mammalian predators. If possible, work schedules and shift changes should be set to avoid the periods from 30 minutes before to 30 minutes after sunrise and sunset during June and July, when mountain plovers and other wildlife are most active.
- Creation of hunting perches or nest sites for avian predators within 0.5 mile of identified nesting areas shall be avoided by burying powerlines, using the lowest possible structures for fences and other structures and by incorporating perch-inhibiting devices into their design. This 0.5-mile buffer and the 200-meter buffer described in the USFWS' Mountain Plover Survey Guidelines (Deibert et al. 1999) must be considered for effects of any action, regardless of surface ownership.
- Capped and abandoned wells shall be identified with markers no taller than four feet with perch inhibiting devices on the top to avoid creation of raptor hunting perches within 0.5 mile of nesting areas.

- Reclamation of areas of previously suitable mountain plover habitat would include the seeding of vegetation to produce suitable habitat for mountain plover.
- To minimize destruction of nests and disturbance to breeding plovers from reclamation activities, no grading, seeding, or other ground-disturbing activities shall occur from April 10 to July 10 unless surveys consistent with the USFWS' Mountain Plover Survey Guidelines (Deibert et al. 1999) find that no plovers are nesting in the area.

Determination

Implementation of the Preferred Alternative is **likely to adversely affect, but not likely to jeopardize the continued existence of** the mountain plover or its habitat. The determination is based on the evaluation of the potential adverse effects of the Preferred Alternative on the mountain plover and includes implementation of the mitigation measures presented in this BA.

Ute Ladies'-tresses Orchid

Existing Environment

Ute ladies'-tresses orchid (*Spiranthes diluvialis*), listed as a federally threatened species, is a perennial herb with erect, glandular-pubescent stems 12 to 50 cm tall arising from tuberous-thickened roots (USFWS 1992). This species flowers from late July to September. Plants probably do not flower every year and may remain dormant below ground during drought years. In Wyoming, Ute ladies'-tresses orchid is known from the western Great Plains in Converse, Goshen, Laramie, and Niobrara counties. Rangewide, Ute ladies'-tresses orchid occurs primarily on moist, sub-irrigated or seasonally flooded soils in valley bottoms, gravel bars, old oxbows, or floodplains bordering springs, lakes, rivers, or perennial streams between 1780 and 6800 feet elevation (Fertig and Beauvais 1999). Suitable soils vary from sandy or coarse cobbly alluvium to calcareous, histic, or fine-textured clays and loams. Populations have been documented from alkaline sedge meadows, riverine floodplains, flooded alkaline meadows adjacent to ponderosa pine-Douglas-fir woodlands, sagebrush steppe, and streamside floodplains. Some occurrences are also found on agricultural lands managed for winter or early season grazing or hay production. Known sites often have low vegetative cover and may be subjected to periodic disturbances (e.g., flooding or grazing). Populations are often dynamic and shift within a watershed as disturbances create new habitat or succession eliminates old habitat (Fertig and Beauvais 1999). The orchid is well adapted to disturbances from stream movement and is tolerant of other disturbances, such as grazing, that are common to grassland riparian habitats (USFWS 1995). It is known to be established in heavily disturbed sites, such as revegetated gravel pits, heavily grazed riparian edges and along well-traveled foot trails on old berms (USFWS 1995). Ute ladies'-tresses orchid is commonly associated with horsetail, milkweed, verbena, blue-eyed grass, reedgrass, goldenrod, and arrowgrass.

This species is known from four populations in Wyoming, all discovered between 1993 and 1997 (Fertig and Beauvais 1999). One of these populations is recorded from northwestern Converse County and is within the Project Area. There is the potential for this species to occur in suitable habitats within the Project Area.

Effects of the Preferred Alternative

The potential for direct effects to the Ute ladies'-tresses orchid is expected to be minimal. There are no existing oil and gas wells in the upper portion of the Antelope Creek sub-watershed near the known population of this species. None of the wells that are part of the Preferred Alternative would be constructed near that location. There is the potential that other populations of this species may occur in the Project Area. Because of the ability of this species to persist below ground or above ground without flowering, single season surveys that meet the current USFWS survey guidelines may not detect populations. As a result, part or all of undetected populations could be lost to surface disturbing activities.

Adverse effects to currently undocumented populations of this species could occur as a result of hydrological alterations associated with the Preferred Alternative. The discharge of produced water is expected to substantially alter the distribution and extent of riparian and wetland areas, with the net effect being an increase in the extent of these areas. This action may provide additional suitable habitat for the Ute ladies'-tresses orchid in areas that are not currently suitable, while at the same time rendering unsuitable some habitat that is currently suitable. Effects along any particular drainage would depend on the amount, quality, timing, and location of water discharge, stream geomorphology, precipitation, and other factors. Salt tolerance can be expected, to some degree, due to the alkaline soils associated with some habitat types of the species. Habitats and populations of this species may be affected by increased erosion or sediment deposition. Some streams would be greatly affected by discharge, while others would be affected only minimally or not at all. The exact nature of water discharge-related impacts would need to be addressed during Application for Permit to Drill (APD) review, when water discharge points have been chosen, and Ute ladies'-tresses surveys completed. It is possible that occurrences of this species downstream of discharge points would not be identified by surveys, particularly if no facilities are planned in the vicinity. These occurrences could be affected by changes in local hydrology resulting from upstream discharge of produced water. The extent of these impacts cannot be quantified at present, due to the lack of surveys for this species, the lack of precise discharge point locations and the lack of knowledge of the interactions between upstream discharges, existing flows, and local conditions in potential habitats for the Ute ladies'-tresses orchid.

Both direct and indirect disturbances to populations and habitats of the Ute ladies'-tresses orchid have the potential to increase the distribution and extent of noxious weeds, such as Canada thistle, that occur in similar habitats. Dense populations of noxious weeds reduce the amount of habitat available to the orchid and could result in the exclusion of the orchid.

Mitigation

- At the discretion of the surface owner, native species would be planted to re-establish special habitats.
- Potentially suitable habitats for Ute ladies'-tresses (i.e., wetlands and associated wet meadow areas) would be surveyed according to USFWS standards (USFWS 1992) if ground-disturbing activities are anticipated within these habitat types. Roads and facility locations would be adjusted to remove any potential for impacts.
- All equipment and vehicles must be washed before moving to another location to minimize the spread of noxious weed seeds.

Determination

Implementation of the Preferred Alternative **is likely to adversely affect, but not likely to jeopardize the continued existence** of the Ute ladies'-tresses orchid or its habitat. The determination is based on the evaluation of the potential adverse effects of the Preferred Alternative on the Ute ladies'-tresses orchid and includes implementation of the mitigation measures presented in this BA.

Cumulative Effects

Implementation of the Preferred Alternative would contribute to cumulative adverse effects to the threatened, endangered, and proposed species in the Project Area. Cumulative short- and long-term disturbances to these species are many and stem from several sources. Included in the evaluated cumulative effects are the direct effects of oil and gas (CBM and non-CBM) extraction related to the Preferred Alternative, as well as development of new oil and gas wells on adjacent lands. Oil and gas development would occur on a mix of federal, state, private, and on split estate lands. Additional oil and gas extraction (CBM and non-CBM) may occur at a later date within the Project Area beyond the level of development currently considered. Activities other than oil and gas extraction contributing to cumulative effects in the Project Area include: coal mining; uranium mining; sand, gravel, and scoria mining; ranching; agriculture; road and railroad construction; and rural and urban housing development.

On-going coal mining activities within the PRB disturb surface lands at a rate of approximately 2,000 acres per year, with 1,850 acres successfully reclaimed on an annual basis. At present, coal mining has disturbed approximately 54,000 acres, while 20,200 acres have been successfully reclaimed. An unknown portion of disturbed coal mining area is currently undergoing reclamation, but has not yet met success standards. A similar level of both new disturbance and reclamation success is expected in the near future.

Uranium mining within the PRB has resulted in the disturbance of approximately 4,400 acres, while sand, gravel, and scoria mining has resulted in the disturbance of approximately 1,200 acres. Agriculture has resulted in impacts to approximately

113,643 acres of lands formally occupied by native vegetation that that served as suitable habitat for wildlife.

Urban development within the PRB has resulted in the loss of approximately 4,362 acres of native vegetation as suitable wildlife habitat. A minor amount of new rural and urban development is expected in the foreseeable future, but no estimate of the amount or types of vegetation disturbance has yet been made. Cumulative impacts to vegetation from roads, railroads, and rural development are anticipated but have not been estimated.

The total acreage directly affected by CBM development related to the Preferred Alternative would not be disturbed simultaneously, because Project development would be distributed over the life of the Project. Some of the disturbed acreage would be reclaimed or would be in the process of being reclaimed when new disturbances are initiated. CBM development is expected to occur at a rate faster than abandonment and reclamation of wells. In the near future, the amount of disturbed habitats would increase, although the anticipated life of CBM wells (12-20 years) indicates that reclamation would eventually overtake new well development, resulting in a net decrease in disturbed vegetation for the long-term.

Cumulative effects would also occur to vegetation resources as a result of indirect impacts. One indirect impact to native vegetation is the potential import and spread of noxious weeds around Project facilities and along roadways. Noxious weeds have the ability to displace native vegetation and hinder reclamation efforts, thus reducing the habitat quality and lengthening the duration of the adverse effect. If weed mitigation and preventative procedures were applied to all construction and reclamation practices, the impact of noxious weeds would be minimized. In areas reclaimed after CBM development elsewhere, the reclaimed areas often differ substantially from undisturbed areas in terms of vegetation cover. Reclaimed areas may not serve ecosystem functions presently served by undisturbed vegetation communities and habitats, particularly in the short-term, when species composition, shrub cover, and other environmental factors are likely to be different. Establishment of noxious weeds and alternation of vegetation along drainages and reclaimed areas has the potential to alter wildlife habitat composition and distribution. As a result, shifts in habitat composition or distribution may affect the four species discussed in this BA.

Unavoidable adverse effects to the four threatened, endangered, and proposed species from the Preferred Alternative would be some direct loss of habitat, indirect loss of habitat due to human and equipment disturbance, habitat fragmentation, displacement of bald eagle prey species and the resultant change in bald eagle foraging, and mortality caused by equipment activities, motor vehicle collisions, power line collisions, and power line electrocution. As a result, individuals may be reduced in number but not enough to significantly impact the populations.

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